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work with the microscope. In addition to the regular instruction in zoölogy by Dr. A. S. Packard and Messrs. C. S. Minot, J. H. Emerton and J. S. Kingsley, a series of afternoon lectures on microscopy will be given by Rev. E. C. Bolles. Admission fee, $20.00; board, $5.00 to $7.00 per week.

Besides this tempting arrangement, a marine zoölogical laboratory will be opened June 1st, on the outer shore of Salem Neck, under the care of Messrs. Emerton and Minot, in a position most favorable for the study and collection of marine plants and animals. The cost will be $20.00 per month, and students can conveniently attend the Summer School of Biology at Salem.

SOIRÉES.—The annual meeting of the Buffalo Microscopical Club, at Goodrich Hall in that city, terminated in a soirée and exhibition of microscopic objects. A large variety of popular and interesting objects were shown under nearly twenty microscopes, to the universal gratification of the large audience. Dr. Geo. E. Blackham, of Dunkirk, and Chas. E. Fuller, of Jamestown, assisted the local members in the entertainment of the evening.

The microscopical section of the Troy Scientific Association and a large party of invited guests were entertained at the residence of the chairman of the section, Dr. R. H. Ward, on the occasion of the annual soirée on the evening of March 4th. The microscopes, over thirty in number and many of them first-class instruments, were arranged on tables in different parts of the house, and the objects were classified in a strictly natural manner, each table with its group of instruments being used to illustrate some one field in the study of nature. By substituting this plan for the want of method which is generally allowed to result from the caprice of individual exhibitors, and the use of a systematically arranged catalogue, and of cards stating the objects shown and the magnifying powers used, the exhibition was carried on promptly notwithstanding the large crowd in attendance. The soirée was the largest and most enthusiastic meeting ever held by the section.

EXCHANGES.—Wanted, some well-posted diatomist to give the correct names of diatoms (arranged) on a few slides in exchange for the slides. C. M. Vorce, 164 Lake street, Cleveland, Ohio.

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SCIENTIFIC NEWS.

— A paper has been recently published in the *Penn Monthly Magazine* by William Blasius of Philadelphia, in which he criticizes the methods of meteorological investigation usually adopted. He, however, commends those employed by Prof. Loomis, of Yale College, but asserts that they have been mostly derived from his own previously issued publications.

— Recent arrivals at the Philadelphia Zoölogical Gardens, Feb. 10, 1878: 2 Chinese or knobbed geese (*Anser cygnoides*), presented; 2 common marmosets (*Hapale jacchus*), 1 black-eared marmoset (*Hapale pencillata*), presented; 2 barn owls (*Strix flammea*, var. *americana*) presented; 3 opossums (*Didelphys virginiana*), presented; 1 red-shouldered buzzard (*Buteo lineatus*), presented; 1 eland (*Oreas canna*) ♀, purchased; 1 siren (*Siren lacertina*), presented; 1 red-shouldered hawk (*Buteo lineatus*), presented; 1 bald eagle (*Haliaëtus leucocephalus*) presented; 2 rough-legged buzzards (*Archibuteo lagopus*), purchased; 3 white rabbits (*Lepus cuniculus*), presented; 4 hybrid fowls, presented; 8 dingos (*Canis dingo*), born in the Garden.—*Arthur E. Brown, Gard. Supt.*

— The Proceedings of the National Academy of Sciences, Vol. I, 1877, contains Selections from the Records of the Home Secretary, Prof. J. E. Hilgard, under whose direction this volume has been published. Unfortunately Congress has not yet authorized the publication of the papers and memoirs presented by the members at the semi-annual meetings of the Academy.

The Biographical Memoirs of the deceased members of the National Academy of Sciences has been published by the Home Secretary, and forms a volume of 343 pages. It contains obituary notices of fifteen deceased members.

— We have received, from Mr. Townend Glover, Manuscript Notes from my Journal, or Entomological Index to name, etc., in Agricultural Reports, with List of Vegetable and Animal Substances injured or destroyed by Insects, etc., Washington, 1877. This is a quarto work of 103 pages in the author's clear and legible handwriting transferred to and printed on stone. It forms a useful supplement to the laborious works of the author on the Diptera and Hemiptera, printed for private distribution.

— A new curriculum of education having been adopted by the board of control of public schools of Philadelphia, which includes a space in each of the divisions throughout the course, to be devoted to object study, the question of the introduction of primary instruction in the natural sciences is being agitated. At the last teachers' institute of the city, held in the Girls' Normal School, a lecture was delivered by Prof. Cope, in advocacy of this measure. In this lecture Prof. Cope explained that teaching in this department should never be without natural objects, models or charts. For general or comparative study, where the student should use a considerable number of objects, it was pointed out that petrology, mineralogy, botany, and entomology present the greatest facilities, since specimens can be obtained in these departments with the greatest ease. In the majority of departments of geology and biology it was maintained by the lecturer, that charts giving simple analyses of structure should be used, and it was recommended that these be of two kinds. Those of the first kind were to stand in place of the text-book in other departments, to be of smaller size, and to be accompanied by pages of explanations, constituting an atlas to be studied by the scholar. The other kind should be of large size and be used in the school room like wall-maps without printed explanation. The exercises should be tests of proficiency of the student in the identification of parts in the specimens or the wall-maps, after study of the atlas or the object, under direction of the teacher. Instruction in classification following identifications of parts, were recommended to be conducted by the aid of simple analytical keys, either drawn by the teacher on the blackboard, or in chart form, like the diagrams of structure, suspended on the wall. The similarity between instruction in geology and structural biology, to geography was commented on, and systematic science was regarded as standing among the first of the methods of training of the human mind in all questions of practice or thought. In the dynamical sciences, or structure in motion, the use of text-books was regarded as necessary.

— The following circular has been issued by the Pennsylvania Board of Agriculture, and is signed by Thos. J. Edge, Secretary. As an effort to obtain reliable information on an obscure subject, by a goverment commission, it is worthy of general attention from those to whom it is addressed:

" Harrisburg, February 1, 1878. Dear Sir:—The report of this Board for your district has named you as a practical dairyman, who would be likely to take an interest in the advancement of our knowledge of dairy matters, and who would also be willing to answer any question which may be asked, with a view of obtaining such information. If our reporter is right in his surmise, and you are willing thus to assist me, you will please signify the same on the enclosed card; giving *full name and address, with number of cows in your dairy*, and return the card at your earliest convenience. This Department is aware that we have enough of theory, and are much in need of practical observation, and we think that by proper application of this kind of observation, you can enable us to render comparatively certain many items which are now in doubt.

" Of such subjects, we have selected the possibility of regulating the sex of calves as the first to claim your attention, and I would respectfully ask your careful and practical observation of the following theory, for one year, and would further ask that you report when you have any information to warrant you in so doing, giving the cases in which the theory has held good, as well as those in which it has failed. You can also confer a favor by directing the attention of your farm club or grange to the matter, and also interest any other dairyman in your neighborhood.

" It has been claimed by good authority, and the claim seems to be supported by proof, in some cases at least, that each alternate ovum will produce a male if impregnated at the proper period: That is, if a cow has just produced a male calf, and is served at the next period of heat, a heifer will be the result; thus each ovum producing alternately male and female. If, as is often the case, your male is kept separate from the cows, you will have superior advantages for observation, and your results will prove of value in determining the question.

"Each one who will thus assist, and gives notice of his desire to do so by enclosed card, will receive a copy of the total result, and will also be entitled to the thanks of the Department."

— An account and figure of a two headed gopher snake (*Pityophis* species), by Mr. J. W. A. Wright, appears in the *Mining and Scientific Press*, San Francisco, February 16, 1878. A similar monstrosity in an eastern species, the common striped snake, we believe, was described by the late Professor Wyman, in the Proceedings of the Boston Society of Natural History for January 21, 1863 (vol. ix).

— The German botanist, Regel, has discovered, according to *Nature*, in the Himalayas a variety of wild onion, which he regards as the original source of our ordinary garden onion. It is called *Allium cepa sylvestre*.

— The well-known Danish conchologist, Dr. A. L. Mörch, died in January last at Nice. The eminent Swedish botanist, Prof. Elian Fries, died at Upsala, February 8, in his 84th year.

— Drs. W. Marshall and A. B. Meyer, have published a memoir, as one of a series of communications to the Zoölogical Museum, at Dresden, "On some new or little known sponges belonging to the Hexactinellidæ found in the Philippines." It seems but the other day since one could have numbered on the fingers of one hand all the known species of this family, so well known to many by that beautiful typical form, the Venus's flower-basket (*Euplectella*), and now the number of described species is very large. In 1872 one of the authors (Dr. Meyer) was staying at Cebú, one of the Philippine group, where *Euplectella aspergillum* is a regular article of trade, quoted at so much a dozen, and where it is not surprising that he should discover a number of other lovely forms in this memoir described and figured. Among the more interesting forms are the following: *Hyatocaulus simplex*, *Myliusia zittelii*, and two species of *Aulodictyon*, all of those found being attached to the basal portion of *Euplectella*. *Semperella schultzei* is figured of a natural size from a specimen twenty-one inches in length, and figures of the spicules of the various new species are also given.—*Nature*.

— The interest in the reproduction of Batrachians is by no means yet exhausted, says *Nature*. A Spanish naturalist, Jimenez de la Espada, has recently discovered additional facts respecting *Rhinoderma darwinii* (of Chili), which was first made known by Mr. Darwin. He finds that the supposed viviparous birth of the young from the female is a very different phenomenon. It is the males which are the nurses, and they have an extraordinary brood-sac, developed as a pouch from the throat, and extending over a great portion of the ventral surface of the animal. In this cavity a number of living tadpoles were found, in numbers of individuals, and the length of the tadpoles was about 14 mm. How these are first developed and nourished is not yet known. Dr. J. W. Spengel translates a portion of the Spanish paper in the current number of the *Zeitschrift für Wissenschaftliche Zoologie*, vol. xxix, part 4.

— We have received and are much pleased with the first two numbers of *The Young Scientist*, a popular Record of Scientific Experiments, Inventions and Progress. It is well adapted for boys, the articles being attractive and clearly written. It has our hearty sympathy and good wishes.

— MacMillan & Co., have in preparation the first part of a "Course of Instruction in Zoötomy," by Prof. Huxley, assisted by Mr. T. J. Parker. They are about to publish "A monograph on the development of Elasmobranch Fishes," by Mr. F. M. Balfour.

— During his recent five months' explorations in Costa Rica, Mr. A. Boucard collected about a thousand specimens representing 250 species of birds, some of great variety and two new to science (*Zonotrichia boucardi* and *Sapphironia boucardi* of Mulsant).

— We copy from Sir J. D. Hooker's address before the Royal Society, the following notice of the U. S. Geological Survey of the Territories, of which Professor Hayden has the charge:

Of the many surveys of the United States Territories undertaken, some by the central government, others by State governments, and still others by private enterprise, more or less aided by public funds, none has effected so much for science as that directed by Dr. Hayden. Its publications, distributed with great liberality, are in every scientific library, and its director is honored no less for the energy and zeal with which he has labored as a topographer and geologist, than for the enlightened spirit in which he has sought to render the resources of the survey available for the advancement of all branches of natural knowledge by every means in his power, and with admirable impartiality.

Having obtained an extended leave of absence from my official duties at the Royal Gardens, at the close of our last session, I accepted an invitation from Dr. Hayden to join his survey, and, in company with our foreign member, Professor Asa Gray, to visit, under his conduct, the Rocky Mountains of Colorado and Utah, with the object of contributing to the records of the survey a report on the botany of those States.

I have thus had some opportunity of learning for myself the extent and value of the operations of the survey, which are so interesting that I venture to think a brief sketch of its rise and progress and a few of its results may be acceptable to you.

When the Territory of Nebraska was admitted into the Union in 1867, Congress set apart an unexpended balance of £1,000 for a geological survey of the new State; and Dr. Hayden, then a young man who had distinguished himself as an indefatigable observer and collector (in various expeditions since 1853), was appointed to conduct it. In 1868 the operations of the survey were continued, and carried westward into the Rocky Mountains of Wyoming, the rich tertiary and cretaceous beds of which were examined and described in detail, and the famous Yellowstone district, with which Dr. Hayden's name will ever be associated, was reconnoitered. The value of the survey was immediately appreciated, and in 1869 a large appropriation was voted by Congress for placing it on its present footing under the supervision of the Secretary of the Interior. In 1869 and 1870 operations were carried on in Colorado and New Mexico; and full reports on the meteorology, agriculture, zoology, and paleontology of these regions, of great interest and importance, were drawn up and subsequently published. In 1871 the detailed survey of this Yellowstone district was begun, and those marvelous natural features were carefully studied which have excited the liveliest interest in Europe, and have induced Congress, on Dr. Hayden's representations, to appropriate the whole area as a government reserve, thus securing to naturalists free access to natural phenomena which in other places, both in Europe and America, are too often monopolized by speculators and closed to the public.

In 1872 the survey was further extended, and was organized into two corps, each provided with a topographer, geologist, mineralogist, meteorologist, and naturalist, and the States of Idaho and Montana were embraced in its operations; in 1873 it was pushed into Colorado, thence into Utah, and on its completion in 1876, an area of not less than 70,000 square miles, much of it exceedingly mountainous, had been included in the survey.

The literature of the survey, consisted, in 1876, of 41 volumes, classified as follows: 1, annual reports, with maps and sections; 2, bulletins for giving speedy publicity to new facts; 3, miscellaneous publications, comprising tables of elevations, catalogues of plants and animals, and meteorological data; 4, monographs on various branches of natural history, especially paleontology, copiously illustrated with admirable plates in quarto, among which are the works of Leidy, Lesquereux, Coues, C. Thomas, Cope, Parry, Meek, Packard, Allen, Hayden himself, and others, all of whom are well known on this side of the Atlantic; lastly, the number of photographs now exceed 4,000, and includes besides geological and geographical features of great interest, views of ancient architectural remains, and of 1,200 Indians belonging to seventy-four tribes.

In giving these particulars I speak from some personal knowledge. I wish that the same could be said of the local habitation of the survey and its museum, which I am assured contains a very extensive and instructive collection; but these are at Washington, and my pressing duties here and at Kew prevented my visiting the federal Capital.

The most important scientific results hitherto derived from the labors of Dr. Hayden and his parties are unquestionably the geological; such as the delineation of the boundaries of the Cretaceous and Tertiary seas and lakes that occupied more than one basin of the mountain of Central North America, and the marvelous accumulation of fossil vertebrates that these ancient shores have yielded. Over an area of many hundred thousand square miles in North America there have been found, within the last very few years, beds of great extent and thickness, of all ages, from the Trias onwards, containing the well-preserved remains of so great a multitude of flying, creeping and walking things, referable to so many orders of plants and animals, and often of such gigantic proportions that the palæontologists of the states, with museums vastly larger than our own, are at a loss for space to exhibit them. So common indeed are some species, and so beautifully preserved, that I saw numbers of them, especially insects, plants and fishes, exposed for sale and eagerly purchased by travelers with confectionery and fruit, at the stalls of the railway station, from the eastern base of the Rocky mountains all the way to California.

An examination of some of these fossils has brought to light the important fact that in North America there is no recognized break between the Tertiary and Cretaceous beds. This is due to the interpolation of a vast lignitic series, the fossils of which furnish conflicting evidence. Concerning this series Dr. Hayden, who has traced it over many hundred miles, observes (Report of Geological Survey, 1874, p. 20), that the character of its palæontological as well as of its strictly geological results is such that whether the entire group be placed in the Lower Tertiary or Upper Cretaceous is unimportant, and that the testimony of the palæontologists will probably always be as conflicting as at present.

I must not end my notices of some of the labors of our scientific brethren in the United States without expressing my admiration of the spirit and the manner in which the Government and people have coöperated in making known the physical and biological features of their country, and my conviction that the results they have given to the world are, whether for magnitude or importance, greater of their kind than have been accomplished within the same time by any people or government in the older continents. How great would now be our knowledge of the climate and natural features of India and of our colonies had the excellent trigonometrical survey of the one and the territorial and geological surveys of the others been supplemented by reports such as those to which I have directed attention!